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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,591	06/06/2005	Theodoor Gertrudis Silvester Maria Rijks	NL021248	6387
65913	7550	04/08/2008	EXAMINER	
NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			THOMAS, LUCY M	
			ART UNIT	PAPER NUMBER
			2836	
			NOTIFICATION DATE	DELIVERY MODE
			04/08/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

# Office Action Summary

**Application No.**

10/537,591

**Applicant(s)**

RIJKS ET AL.

**Examiner**

Lucy Thomas

**Art Unit**

2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/08)  
Paper No(s)/Mail Date 6/06/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 5 and 8 are objected to because of the following informalities: Recitation of "the input for a single control voltage is a transistor" in Claim 5 renders the claim indefinite, as it is unclear how the input which is a signal can be a transistor which is a device. Appropriate correction is required.

For examination purposes, "the input for a single control voltage is from a transistor" is considered.

Recitation of "the control electrodes of the first and second MEMS elements" and "the cantilever arms" in Claim 8 lack antecedent basis. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 7-9, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Miles et al. (US 2004/0058532) (Miles '532). Regarding Claim 1, Miles '532 discloses an electronic device comprising an array of micro-electromechanical system (MEMS) elements 10 (Figures 1-9, Paragraph 20), said array providing a plurality of

states at its output (each MEMS element of the array having characteristic response results in plurality of states at the output), wherein the MEMS elements each have a first state and a second state (displaced/driven and undisplaced/undriven state), and wherein a transition from the first to the second state is effected by an opening voltage  $V_{\text{release}}$ , and a transition from the second to the first state is effected by a closing voltage  $V_{\text{actuation}}$ .

the array comprises an input for a single control voltage  $V_{\text{bias}}$  that is applied to all the MEMS elements whereby the various states of the array are to be obtained by varying the single control voltage (see Paragraph 22).

Regarding Claim 2, Miles '532 discloses that the MEMS elements each have a characteristic hysteresis curve, such that the opening voltage is different from the closing voltage, which characteristic hysteresis curves and the corresponding opening and closing voltages differ from one MEMS element to another MEMS element (see Figures 5, 7, Paragraphs 22, 28-29).

Regarding Claim 7, Miles '532 discloses that each of the MEMS elements in the array has a fixed electrode 12 and a movable electrode 14 that is movable towards and away from the fixed electrode by application of the closing and the opening voltage respectively, such that in the first state (displaced state) the distance between the fixed and the movable electrode is smaller than in the second state (undisplaced state), which movable electrode is suspended substantially parallel to the fixed electrode (see Figures 1-2) anchored to a support structure 18 by at least one cantilever arm having a spring constant (see arms of 14 with one end on 18 in Figure 2), which MEMS element

is provided with an actuation electrode 20 with an actuation area for provision of the closing and opening voltages (Paragraph 19).

Regarding Claim 8, Miles '532 discloses that a first and a second MEMS element in the array have different characteristic hysteresis curves in that actuation areas of control electrodes of the first and second MEMS element are different (see Paragraph 22, different layer thickness results in different cross sectional area of the electrode).

Regarding Claim 9, Miles '532 discloses that at least one dielectric layer  $Al_2O_3$  having a dielectric permittivity is present between the fixed and the movable electrode, such that the MEMS element is a MEMS capacitor, of which capacitor the first state has a first state capacitance, and a first and a second MEMS capacitor in the array have different characteristic hysteresis curves in that the first state capacitances of the first and the second MEMS capacitor are different (see Paragraphs 22, 28-29, Figures 5, 7, reflectance shown on Y-axis varies due to change in capacitance/charge trapping).

Regarding Claim 12, Miles '532 discloses a method for driving 22 an array of micromechanical system (MEMS) elements of Claim 1, wherein a single control voltage is applied in common to the MEMS elements in the array, which voltage is varied to obtain the various states of the array (see Figures 1-2, drive mechanism 22 apply control voltage to electrode 20).

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miles et al. (US 2004/0058532) (Miles '532). Regarding Claims 10-11, Miles discloses that the characteristic hysteresis curves differing from one MEMS element to another MEMS element by their individual width (see paragraph 22). Miles does not specifically disclose that the MEMS elements are designed such that the hysteresis curve having a smaller width is located fully within the width of the hysteresis curve having the next-larger width (Claim 10), and that the curves of the MEMS elements are centered around a common centerline in the operational region. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Miles '532, and to design the MEMS elements, to have the smaller width elements fully located within the width of the next-larger width, and to have offset voltage to center the curves, because Miles teaches that the width variations can be caused by several factors, such as thickness of the layers, and resistance variations of the lines (see paragraph 22, lines 11-18).
6. Claims 3, 4, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miles et al. (US 2004/0058532) (Miles '532) in view of Chui et al. (US 6,574,033). Regarding Claims 3, 4, and 6, Miles '532 discloses the array of MEMS elements which forms pixels within a reflective display, but does not specifically disclose that the MEMS elements in the array are connected in parallel (Claim 3), and the number of elements in the array is in the range from 2 to 10 (Claim 4), and a plurality of arrays of MEMS elements, each array having an input for single control voltage (Claim 6).

Chui discloses a MEMS device (see Figure 6), where the MEMS elements are arranged in an array 602 and the number of elements in the array is in the range from 2 to 10 (2x4 grid of IMODs/MEMS, which is 8 MEMS per array), and a plurality of arrays of MEMS elements (three arrays 602, 604, 606, see also Claims 2-3), each array having an input for single control voltage (control voltage normalized to actuate all MEMS, see Column 4, lines 64 – Column 5, lines 23). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device Miles '532 and to provide an array of parallel elements ranging from 2 to 10, and plurality of arrays as taught by Chui, to have multiple arrays having defining characteristics in the undriven state (see Chui, Column 5, lines 5-12).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miles et al. (US 2004/0058532) (Miles '532) in view of Miles (US 6,674,562) (Miles '562).

Regarding Claim 5, Miles '532 does not disclose that the input for a single control voltage is from a transistor. Miles '562 discloses a MEMS device 410 (see Figure 4C) where the input for a single control voltage is from a transistor (see transistors 404 output given to 410). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Miles '532 and to include a transistor as taught by Miles 562, as a means to provide variable voltage levels for the single control voltage.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-

Art Unit: 2836

6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Sherry/  
Supervisory Patent Examiner, Art Unit 2836

LT  
March 27, 2008